NASA PM CHALLENGE 2006

"Making Decisions – Doing That Voodoo That You Do
(How to Make Better Decisions)"

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United Space Alliance, LLC

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A Thought…

"Nothing is more difficult,

and therefore more precious,

than to be able to decide."

- Napoleon

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Some Not So Great Moments in Decision Making….

1943: Germany decides to invade Russia

1963:John Kennedy approves the Bay of Pigs invasion of Cuba

1972: Ford Motors decides not to recall the Pinto

1999: Leon decides to buy Enron stock…

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Some Great Moments in Decision Making….

- **1964: IBM commits $5B to System 360 development**

- **1975: Citibank commits $100M to build ATMs**

- **1983: Wal-Mart commits $24M to build a private satellite network**

- **2006: Your decision to attend this seminar session!**

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Discussion Topics

- **What makes a decision a "good" decision?**

- **Better Decision Making – PrOACT*-ive Method**
  - **A Methodical Approach and How To Use It**

- **Traps and Pitfalls to Watch Out For**

- **Wrap-Up**

* "Smart Choices – A Practical Guide to Making Better Life Decisions", by Hammond, Keeney, and Raiffa

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What Is A "Good" Decision...

Applied "good" process regardless of result?

OR

The outcome was what you thought it should be?

OR

The outcome resulted in a "Win-Win" position for everyone?

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Steps to Better Decision Making - PrOACT

Problem

Objectives

Alternatives

Consequences

Tradeoffs

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Problem

A good solution to a well-stated problem is frequently better than an excellent solution to a poorly stated one….

- Create, in writing, a decision / problem statement

- Ask Yourself:

  - Is this really something I need to deal with now?

  - Is this an accurate description?

  - Is the scope too broad? Too narrow?

  - What assumptions and constraints are being made?

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Problem – Scope of the decision statement

Consider the following:

"In order to become more fit, which health club should I join?"

Now consider this statement:

"What can I do to become more fit?"

What possible solutions exist in the second statement that don't exist in the first?

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Problem – Assumptions & Constraints

On the Plus side

- Helps you narrow focus

- Prevents / minimizes time wasted on irrelevant options

On the Negative side

- Blinds you from seeing better solutions

- Might impose constraints, limitations on future decision alternatives

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Objectives

- **Why objectives?**

  "If you don't know where you're going,

  any route will get you there."

  Lewis Carroll, "Alice in Wonderland"

- **Objectives help guide your decision making**

  - **The information you need to collect**

  - **Rationale supporting your final choice**

  - **How much time and energy the decision deserves**

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Objectives – How to Figure Them Out

- Write down concerns to be addressed by your decision

- Convert concerns into crisp objectives ("Verb-Object")
  - "Could have a big impact on the environment" may become "Mitigate environmental damage"
  - "Accumulate as much money as possible" may become "Achieve and maintain a good quality of life in retirement"

- Separate ends from means to get to fundamental objectives
  - Means objectives lead the way toward discovering fundamental objectives
  - For each objective ask "Why is this important?"

- Clarify each fundamental objective – WHAT did you really mean

- Test your objectives
  - Consider several potential solutions – Could I live with the resulting choices?
  - Use each objective to explain the rationale for your decision

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Alternatives

Alternatives - the raw material of decision making, but

- You can never choose an alternative you haven't been given, and

- You chosen alternative can be no better than the best of those you have to choose from

Start with your Objectives list – ask "How?"

- Challenge constraints – especially mental barriers

- Do your own thinking first, but then engage others

- Create your alternatives list first – evaluate them later

- If you think you're done, keep going – but not forever!

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Consequences

Consequences tie together
Objectives and Alternatives

- **Four step process:**
  - Mentally put yourself in the future and evaluate each alternative's true significance against objectives
  - Create an informal description of the characteristics of each consequence (quantifiable terms)
  - Quickly eliminate poor alternatives
  - Create a "consequences table" for remaining alternatives

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<u>C</u>onsequences Table example

Objectives	Airline alternatives to go from Houston to Rome, Italy			
	Airline A	*Airline B*	*Airline C*	*Airline D*
Round trip ticket price	$2,500	$2,400	$1,800	$2,200
Number of flights available on weekdays	2	3	7	5
Availability of an aisle seat	Low	Average	Average	High
Number of flight connections	2	2	2	0
In-flight movie available	Yes	Yes	Yes	Yes
Availability of meal service	Pretzels	Hot meal	Peanuts	Sandwich bistro
Airline on-time arrival record	50%	95%	85%	95%
Member of their frequent flyer program	No	Yes	Yes	Yes

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Tradeoffs

The issue → Decisions with multiple objectives cannot be resolved by focusing on any one objective

The solution → Even Swap Method

- **Rank Consequences (1,2,3,…) based on how well each satisfies the objective (look for "dominance")**

- **If # of alternatives still > 1, consider importance of each alternative against another and "barter"**

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<u>T</u>radeoffs - <u>C</u>onsequences Table example

Objectives	Airline alternatives to go from Houston to Rome, Italy			
	Airline A	*Airline B*	*Airline C*	*Airline D*
Round trip ticket price	$2,500 (4)	$2,400 (3)	$1,800 (1)	$2,200 (2)
Number of flights available on weekdays	2 (4)	3 (3)	7 (1)	5 (2)
Availability of an aisle seat	Low (3)	Average (2-tie)	Average (2-tie)	High (1)
Number of flight connections	2 (2-tie)	2 (2-tie)	2 (2-tie)	0 (1)
~~In-flight movie available~~	~~Yes (1-tie)~~	~~Yes (1-tie)~~	~~Yes (1-tie)~~	~~Yes (1-tie)~~
Availability of meal service	Pretzels (3-tie)	Hot meal (1)	Peanuts (3-tie)	Sandwich bistro (2)
Airline on-time arrival record	50% (3)	95% (1-tie)	85% (2)	95% (1-tie)
~~Member of their frequent flyer program~~	No (2)	Yes (1-tie)	Yes (1-tie)	Yes (1-tie)

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Tradeoffs – Advice on making Even Swaps

- **Make easier swaps first**

- **Focus on amount of the swap, not the importance of the objective**

- **When swapping a piece of the whole, think of its value in terms of the whole**

- **Make consistent swaps**

- **Seek information to make intelligent swaps**

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Tradeoffs - Consequences Table example

Objectives	Airline alternatives to go from Houston to Rome, Italy			
	Airline A	Airline B	Airline C	Airline D
Round trip ticket price	$2,500 (4)	$2,400 (3)	$1,800 (1) ($2,000)	$2,200 (2) ($1,800)
Number of flights available on weekdays	2 (4)	3 (3)	7 (1)	5 (2)
Availability of an aisle seat	Low (3)	Average (2-tie)	Average (2-tie)	High (1)
Number of flight connections	2 (2-tie)	2 (2-tie)	2 (2-tie)	0 (1) (-$400 for 2)
In-flight movie available	Yes (1-tie)	Yes (1-tie)	Yes (1-tie)	Yes (1-tie)
Availability of meal service	Pretzels (3-tie)	Hot meal (1)	Peanuts (3-tie)	Sandwich bistro (2)
Airline on-time arrival record	50% (3)	95% (1-tie)	85% (2) ($200 for 95%)	95% (1-tie)
Member of their frequent flyer program	No (2)	Yes (1-tie)	Yes (1-tie)	Yes (1-tie)

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Decision Making Traps and Pitfalls

- **Anchoring**

- **Status Quo**

- **Sunk-Cost**

- **Confirming Evidence**

- **Framing**

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The Anchoring Trap

- **What**
  - You give disproportionate weight to the first information received
  - Initial data, estimates, or impressions prejudice our subsequent thoughts

- **Examples**
  - Price quote on an unmarked item from a salesman
  - Using historical data as a basis for future projections

- **How to Recognize and Avoid the Trap**
  - Think about a decision yourself before engaging others
  - Seek information from a variety of sources
  - Don't "anchor" thoughts of others by giving too much data

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The Status Quo Trap

- **What**
  - Predisposition to perpetuate the current situation
  - More alternatives to consider requires more effort
- **Examples**
  - "Horse-less carriages" looked like horse-drawn buggies
  - Using the same supplier or vendor without getting quotes from other sources
- **How to Recognize and Avoid the Trap**
  - Remember your Objectives; ask how would they be served by the status quo
  - Identify and carefully examine Alternatives to the status quo

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The Sunk-Cost Trap

- ## What
  - Making a choice based on a past decision
  - Not able to admit a mistake

- ## Examples
  - Continuing to repair that old "junker"
  - Continuing to carry an employee who should be fired

- ## How to Recognize and Avoid the Trap
  - Involve people who weren't involved with past decisions
  - Put self-esteem aside

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The Confirming Evidence Trap

- ## What
  - You have subconsciously made a decision and are seeking out support for your choice
  - Influence of confirming information given greater weight than conflicting information

- ## Example
  - Asking advice about a stock from someone who just bought some

- ## How to Recognize and Avoid the Trap
  - Get someone you respect to play "devil's advocate"
  - Actively search for conflicting information
  - Avoid leading questions that encourage confirming evidence

The Framing Trap

- ## What

  - **People tend to be risk-averse when a problem is posed in terms of gains; but risk seeking when problem is expressed in terms of avoiding loss**

- ## Example

Three barges, each with a cargo worth $200,000 sank off the coast of Alaska. The salvage company provides you with two options, both of which will cost the same:

  A. **This plan has a 1/3 probability of saving the cargo on all the barges, worth $600,000, but has a 2/3 probability of saving nothing.**

  B. **This plan will save the cargo of one of the three barges, worth $200,000**

  Which plan would you choose?

71% of people asked picked the "less risky"
Plan A, which would save one barge for sure….

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The Framing Trap

Three barges, each with a cargo worth $200,000 sank off the coast of Alaska. The salvage company provides you with two options, both of which will cost the same:

C. This plan will result in the loss of two of the three cargoes, worth $400,000

D. This plan has a 2/3 probability of resulting in the loss of all three cargoes and the entire $600,000, but has a 1/3 probability of losing no cargo.

Which plan would you now choose?

80% of people asked picked Plan D

However, Plan C is equivalent to Plan A, and Plan D Is equivalent to Plan C!

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The Framing Trap

- ## How to Avoid the Framing Trap

  - Don't automatically accept the way you (or someone else) framed the initial problem statement

  - Work to reframe the problem statement <u>throughout</u> the decision making process

  - When others recommend decisions examine how they framed the problem; challenge them with different frames

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Wrap-Up

Decision making is a process and if used, can lead to better decisions
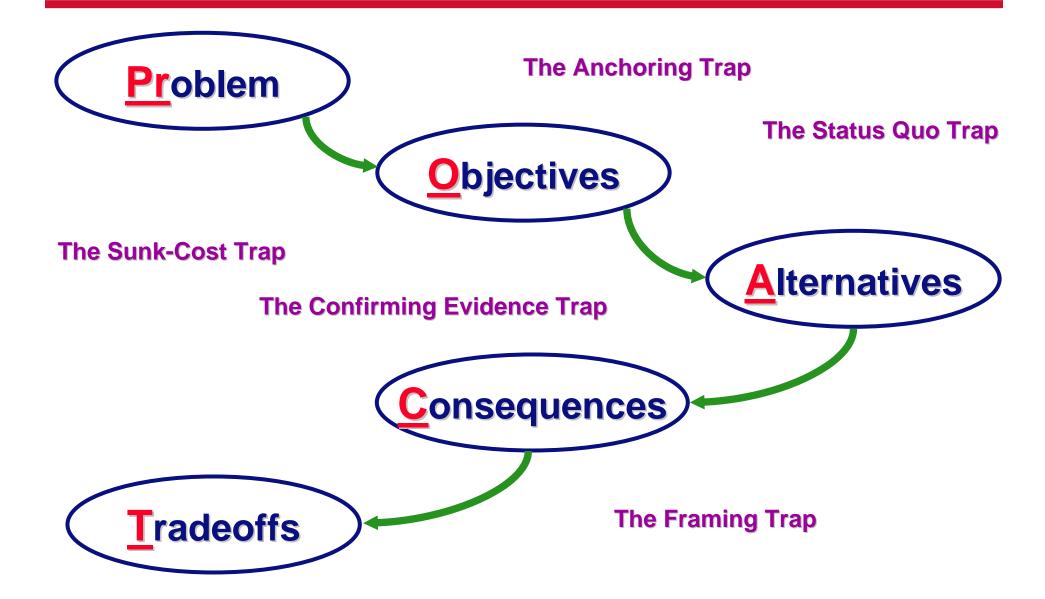
- **It works in business as well as personal life**
- **It works alone, and with groups**

PrOACT-ive decision making is better than

- **Having to make a decision in crisis**
- **Missing the opportunity because someone else couldn't wait for you**
- **Having someone make the decision for you**

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Wrap-Up: The **PrOACT**-ive Process

Problem

The Anchoring Trap

The Status Quo Trap

Objectives

The Sunk-Cost Trap

Alternatives

The Confirming Evidence Trap

Consequences

Tradeoffs

The Framing Trap

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One Final Thought…

"When you own your choices,

you own their consequences."

\- Jack Welch,

from his book "Winning"

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Recommended Readings

"Winning Decisions: Getting it Right the First Time", by J. Edward Russo and Paul J. H. Schoemaker

"Smart Choices: A Practical Guide to Making Better Life Decisions", by John S. Hammond, Ralph L. Keeney, and Howard Raiffa

"Harvard Business Review on Decision Making", Harvard Business School Press

Fortune Magazine, Volume 151, Number 13, June 27, 2005

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